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The Endeavor Plus™ Single Board Computer

User's Guide

Manual PN: 931-0000-03-A
February 2002

CE

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How to Use This Guide

This manual describes how to configure your Endeavor Plus single board computer to meet various operating requirements.

Note: Additional technical information, BIOS updates, and drivers are available from the ICS Advent Web site, **www.icsadvent.com,** under "Technical Support".

The following is a summary of the chapter contents:

- **Chapter 1: Introduction** provides an overview of the system features, product specifications, and basic system architecture.
- **Chapter 2: Hardware Configuration Setting** provides definitions and locations of jumpers and connectors.
- **Chapter 3: System Installation** describes how to properly mount the CPU, main memory, and DiskOnChip for safe installation and provides a programming guide for the Watchdog Timer.
- **Chapter 4: BIOS Setup Information** provides definitions of setup parameters and describes how to get advanced BIOS performance and update the BIOS with the new release available from the ICS Advent Web site. In addition, a POST checkpoint list is provided to help with troubleshooting.
- **Chapter 5: Troubleshooting** provides a few helpful tips to quickly get the Endeavor Plus single board computer running without failure and some operating system (OS) diagnostics.
- **Appendix A: WDT Programming** provides a general description of watchdog timer programming, configuration register definitions, and and some guidelines.

Customer Comments

If you experience any problems with this manual or just want to provide some feedback, please send us a message using the online form under “Contact Us” on our Web site (*www.icsadvent.com*) under “Technical Support.” Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised manual in our online Support Library. Thank you.

Note: You may also use the online form on our Web site to submit comments or concerns about our products, or request technical support.

Advisory Conventions

Three types of advisories are used throughout the manuals to provide helpful information or to alert you to the potential for hardware damage or personal injury. They are Notes, Cautions, and Warnings. The following is an example of each type of advisory. Use caution when servicing any electrical component.

Note: A Note indicates information that will help you make better use of the system.

CAUTION

A CAUTION indicates potential damage to hardware and tells you how to avoid the problem.

WARNING

A WARNING indicates the potential for bodily harm and tells you how to avoid the problem.

Disclaimer: We have tried to identify all situations that may pose a warning or caution condition in this manual. However, ICS Advent does not claim to have covered all situations that might require the use of a Caution or Warning.

Safety Instructions

Before handling the Endeavor Plus single board computer, read the following instructions and safety guidelines to prevent damage to the product and to ensure your own personal safety. Refer to the "Advisories" section for advisory conventions used in this manual, including the distinction between Warnings, Cautions, and Notes.

- Always use caution when handling/operating the computer. Only qualified, experienced, authorized electronics service personnel should access the interior of the computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.

- Use extreme caution when installing or removing components. Refer to the installation instructions in this manual for precautions and procedures. If you have any questions, please contact ICS Advent Post-Sales Technical Support.

WARNING

High voltages are present inside the chassis when the unit's power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

1) Turn off the computer and any peripherals.

2) Disconnect the computer and peripherals from their power sources to prevent electric shock or system board damage.

3) Follow the guidelines provided in "Protecting Against Electrostatic Discharge" on the following page.

4) Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

CAUTION

Do not attempt to service the system yourself except as explained in this manual. Follow installation and troubleshooting instructions closely.

Protecting Against Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. ICS Advent strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.

When Operating a Computer

When operating a computer, observe the following operating guidelines:

- To help prevent electric shock, plug computer power cables into properly grounded power sources. Use cables equipped with three-prong plugs to ensure proper grounding. Do not use adapter plugs or remove the grounding prong from the cable.
- Be sure nothing rests on chassis cables and that cables are not located where they can be stepped on or tripped over.
- Keep objects out of chassis openings. This can cause fire or electric shock by shorting out interior components.
- Keep chassis away from radiators and heat sources. Do not block cooling vents or place chassis in a closed-in wall unit.
- To help protect chassis from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Consideration should be given to the connection of the equipment to the supply circuit and the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- The ambient temperature within the rack may be greater than room ambient temperature. Installation should be such that the amount of air flow required for safe operation is not compromised. Consideration should be given to the maximum rated ambient temperature.

Rack Stability

Installation should be such that a hazardous stability condition is not achieved due to uneven loading. The chassis should be secured to the rack frame with retaining screws when it is slid in the rack. This will prevent the chassis from sliding forward on the slide rails if the cabinet is tilted or vibrated, resulting in possible mechanical or electrical damage to the system or injury to personnel.

WARNING

There is a real danger of a rack toppling if a heavy chassis is extended on its slide rails from the rack. ICS Advent strongly recommends you anchor the mounting rack to the floor or wall to prevent this from happening.

Safety Standards

The product(s) described in this manual has met the safety requirements of Underwriters Laboratories (UL) for the US and Canadian market based on UL's published Standards for Safety.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

FCC Compliance Statement for Class A Devices

The product(s) described in this manual has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interference or to be noncompliant with the appropriate standards for its intended use.

CE Certification

CE The product(s) described in this manual complies with all applicable European Union (CE) directives. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques. Although ICS Advent offers accessories, the customer must ensure that these products are installed with proper shielding to maintain CE compliance. ICS Advent does not offer engineering services for designing cabling systems. In addition, ICS Advent will not retest or recertify systems or components that have been reconfigured by customers.

Guarantee and Warranty Policy

Guarantee

A thirty day money-back guarantee is provided on all standard products sold. Special order products are covered by our Limited Warranty, *however they may not be returned for refund or credit. EPROMs, RAM, Flash EPROMs or other forms of solid electronic media are not returnable for credit - but for replacement* only. An extended warranty is available. Consult the factory.

Refunds

In order to receive a refund on a product for the purchase price, the product must not have been damaged by the customer or by the common carrier chosen by the customer to return the goods and the product must be returned complete (meaning all manuals, software, cables, etc.) within 30 days of receipt and in an as-new and resalable condition. The "Return Procedure" must be followed to assure a prompt refund.

Restocking Charges

Product returned *after* 30 days, and *before* 60 days, of the purchase will be subject to a minimum 20% restocking charge and charges for any damaged or missing parts. Products not returned within 60 days of purchase, or products which are not in an as-new and resaleable condition, are not eligible for a credit return and will be returned to the customer.

Limited Warranty

Effective April 1, 1998, all products carry a 2-year limited warranty. Within 2 years of purchase, ICS Advent will repair or replace, at our option, any defective product. ICS Advent will service the warranty for all standard catalog products for the first two years from the date of shipment. Please note: The 2-year warranty may not apply to special promotion items. Please consult the factory for warranty verification.

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than ICS Advent or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of ICS Advent or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's manual.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. ICS Advent reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

Return Procedure

For any Guarantee or Limited Warranty return, please contact ICS Advent Customer Service at 800-480-0044 or 858-677-0877 and obtain a Return Material Authorization (RMA) Number. All product(s) returned to ICS Advent for service or credit **must** be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items **must** be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty **must** include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing the date of purchase.

To reduce risk of damage, returns of product must be in an ICS Advent shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from ICS Advent Customer Service at a nominal cost.

ICS Advent owns all parts removed from repaired products. ICS Advent uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If ICS Advent repairs or replaces a product, its warranty term is not extended.

ICS Advent will normallly return your replacement or repaired items via Second Day Air. Overnight delivery or delivery via other carriers is available at an additional charge.

Shipments not in compliance with this Guarantee and Limited Warranty Return Policy will not be accepted by ICS Advent.

Limitation of Liability

In no event shall ICS Advent be liable for any defect in hardware, software, loss, or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. ICS Advent's liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by ICS Advent or its authorized agent.

Some sales items and customized systems are **not** subject to the guarantee and limited warranty. However in these instances, any deviations will be disclosed prior to sales and noted in the original invoice. **ICS Advent reserves the right to refuse returns or credits on software or special order items.**

Chapter 1

Introduction

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System Features

The Endeavor Plus all-in-one single board computer accepts either a Celeron or a high performance Socket-370 Pentium III based CPU and is compatible with high-end computer systems with PCI Local Bus architecture. It is designed to meet today's demanding speeds, while maintaining complete compatibility with hardware and software designed for the IBM PC/AT. It is perfect for building up high performance systems. The onboard Ultra-160/m SCSI adapter, 3D Graphics display, and fast Ethernet interface provides full functionality and high performance to all segments of the PC market.

The Endeavor Plus single board computer will work with Intel Celeron and Pentium III processors, and supports up to 512MB of DIMM memory. The enhanced onboard PCI/IDE interface can support four drives up to PIO mode 4 and Ultra DMA/33/66 sync mode. The onboard Super I/O Chipset integrates one floppy controller, two serial ports, one keyboard controller, one hardware monitor, one IrDA port, and one parallel port. Two high performance 16C550-compatible UARTs provide 16-byte transmit/receive FIFOs, and the multi-mode parallel port supports SPP/EPP/ECP function. In addition, two USB (Universal Serial Bus) ports provide high speed data communications between peripherals and the computer.

The Endeavor Plus works with standard PICMG and Legacy ISA backplanes. The onboard 32-pin DIP socket supports the M-systems DiskOnChip (DOC) 2000 product up to 144MB. The Watchdog Timer function can monitor your system status. Two 6-pin Mini-DIN connectors are provided to connect PS/2 compatible mice and keyboards. The Flash ROM BIOS can be easily updated in the field. A standard 5.25-inch drive power connector is reserved for more power for large power applications, and the additional 5-pin shrouded connector is provided for connecting to a keyboard interface on certain backplanes. The high precision Real Time Clock/Calendar is built-in for accurate scheduling and storing configuration information. One 4-pin header is designed to support ATX power function on certain backplanes. All of these features make the Endeavor Plus excellent for stand-alone applications.

There are three models related to the Endeavor Plus, as shown below:

Table 1-1.Endeavor Plus Family

Feature / Model	Onboard 7892 Ultra 160/m SCSIHost Adapter	Onboard 10/100 BaseT 82559 Ethernet Controller	Onboard PCI-to-ISA Bridge , DOC, and ISA BUS support, video 810 chipset
Endeavor Plus VES	Yes	Yes	Yes
Endeavor Plus VE	No	Yes	Yes
Endeavor Plus V	No	No	Yes

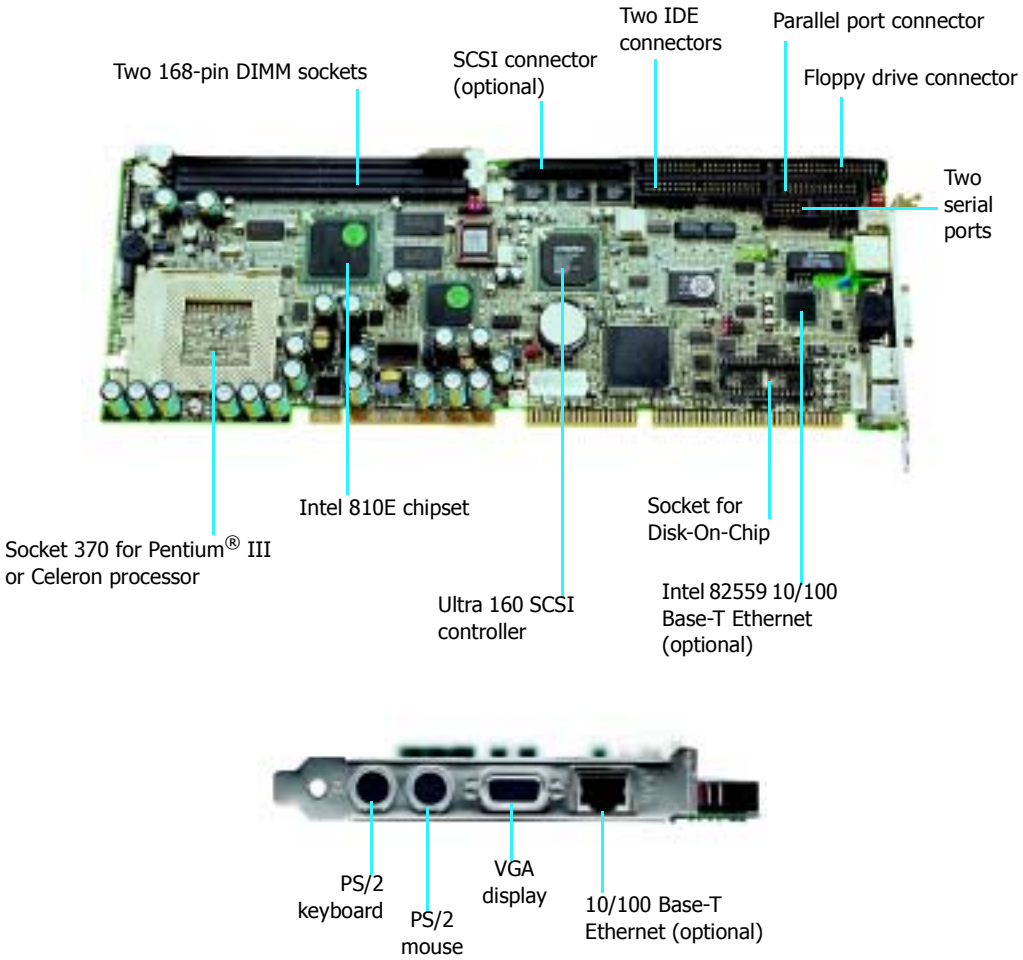


Figure 1-1. Endeavor Plus

Checklist

The Endeavor Plus package includes the following basic items:

- One Endeavor Plus single board computer
- One 26-to-DSUB25 Parallel cable
- One Serial cable with two COM ports
- One FDC cable
- One ATA/66 IDE cable
- One Dual USB Port Cable
- One USB connector filler panel
- One Ultra-160/m SCSI 68-pin cable with SE/LVD terminator (VES model only)
- One CD with the 810e Graphic drivers (supporting Windows 95/98/NT 4.0, Linux, OS/2, Windows 3.1), LAN driver (supporting Windows 95/98/NT 4.0), and SCSI drivers
- Four diskettes for SCSI drivers (supporting Windows 95/98/NT 4.0, Linux) (VES model only)

If any of these items are damaged or missing, contact ICS Advent and save all packing materials for future replacement and maintenance.

Product Specifications

- Main processor: Intel Celeron 333/366/400/433/466/500/533MHz processor or Intel Pentium III FC-370 500/550/700/800/850MHz processor.
- CPU Front Side Bus Clock: 66/100MHz
- CPU Core/Bus Clock Ratio: x2 to x8
- BIOS: AMI system BIOS with 4Mbit Firmware Hub to support DMI, PnP, APM, and ACPI
- Main Memory: Two 168-pin DIMM sockets, supporting 3.3V SDRAM up to 512MB (system will run ECC but will not utilize the ECC advantage; the system will not POST if a registered (buffered) DIMM is installed)
- Chipset: Intel 810e Chipset
- Bus Interface: Follows PICMG standard (32-bit PCI and 16-bit ISA), fully complies with PCI bus specification V2.1
- PCI IDE Interface: Supports two enhanced IDE ports up to four HDD devices with PIO mode 4 and Ultra DMA/33, Ultra DMA/66 mode transfer
- Floppy Drive Interface: Supports up to two floppy disk drives, capacities of 360K to 2.88MB
- Serial Ports: two high speed 16C550 compatible UARTs with 16-byte T/R FIFOs
- IR Interface: one 6-pin header for serial standard infrared wireless communication
- Parallel Port: Supports SPP, Bi-direction, EPP/ECP mode
- USB Interface: two USB (Universal Serial Bus) ports for high speed I/O peripheral devices
- PS/2 Mouse and Keyboard Interface: two 6-pin Mini-DIN connectors and one 5-pin shrouded connector for PS/2 mouse, keyboard, and backplane connections (on Legacy backplanes only)

- ATX Power Control Interface: One 4-pin header to support ATX power control with Modem Ring-On and Wake-On-LAN function
- Auxiliary I/O Interfaces: System reset switch, external speaker, keyboard lock and HDD activity LED
- Real-Time Clock/Calendar (RTC): Real-Time Clock/Calendar with battery backup for 7-year data retention
- Watchdog Timer: 1, 8, 16, 32 second and 1, 10, 30, 60 minute time-out intervals through BIOS setting or 255 intervals from 0.5 sec/min to 254.5 sec/min through software programming
- DiskOnChip (DOC) Feature: Reserves one 32-pin socket for M-systems Flash Disk up to 144MB
- System Monitoring Feature: Monitors CPU and system temperature, operating voltage, and fan status
- High Driving Capability: Supports high driving capability for multi-slot ISA bus
- External Power Connector: Supports one standard 5.25-inch disk power connector to enhance power driving
- Onboard VGA: Intel 82810E integrated graphics controller with 4MB display cache
- Onboard Ultra-160/m SCSI: Uses Adaptec AIC-7892 Ultra-160/m SCSI controller to support one 68-pin interface
- Onboard Ethernet: Utilizes Intel 82559 Fast Ethernet controller to support RJ-45 interface at 10/100 BASE-T speed
- Power Good: Onboard power good generator with 300ms to 500ms reset duration
- MTBF: 100,000 hours

- Endeavor Plus Physical and Environmental Requirements:
  - Outline Dimension (L X W) : 338.5mm (13.32”) X 121.5mm (4.78”)
  - PCB Layout: Six layers
  - Power Requirements: +5V @ 6.0A (typ.), +12V @ 100mA, -12V @ 30mA
  - Operating Temperature: 0 ^{o}C to 60 ^{o}C (32 ^{o}F to 140 ^{o}F)
  - Storage Temperature: -20 ^{o}C to 80 ^{o}C (-68 ^{o}F to 176 ^{o}F)
  - Relative Humidity: 5% to 95%, non-condensing

System Architecture

The Endeavor Plus provides a highly integrated system solution. The latest system architecture of the Endeavor Plus includes two main VLSI chips, 82810E GMCH (Graphics and Memory Controller Hub), and 82801AA ICH (I/O controller hub) to support Celeron and Pentium III processors, SDRAM, 3D graphics display, PCI bus interface, APM, ACPI compliant power management[1], USB port, SMBus communication, and Ultra DMA/33/66 IDE Master. The onboard super I/O chip, W83627HF, supports a PS/2 keyboard/mouse, two UARTs, FDC, Hardware Monitor, Parallel Port, Watchdog Timer, and Infrared interface. In addition, two onboard devices (such as SCSI and LAN) give the user a more flexible and reliable application in a highly integrated environment.

The CPU socket adopts the Socket 370 type to support high availability, reliability, and easy operation in general industry applications.

The 82810E Hub provides an integrated memory controller and graphics capability (Direct AGP). To deliver AGP class graphics performance to computers at a reduced cost. It dynamically allocates and de-allocates system memory for complex 3D textures, preserving the benefits of standard AGP add-in solutions. Its 64-bit AGTL+ based host bus interface, optimized 64-bit DRAM interface supports two 3.3V DIMMs at the maximum bus frequency of 100 MHz. The 32-bit PCI bus interface supports four PCI masters for external backplane support.

The 82801AA Hub employs the Accelerated Controller Hub architecture which makes a direct connection from the graphics and memory to the IDE controllers, the Dual USB ports, and the PCI cards. It supports two-channel dedicated Ultra DMA-33/66 IDE master interfaces, full Plug-n-Play compatibility, APIC (Advanced Programmable Interrupt Controller) interface, and internal real-time clock (RTC) to maintain the time and date of a system. It also supports a two-port USB (Universal Serial Bus) interface and PCI 2.1 Compliance operation. The Hub fully supports Operating System Directed Power Management via the Advanced Configuration and Power Interface (ACPI) specification. It is also linked via the Firmware Hub Link bus to 82802AB Firmware Hub to support BIOS read/write access. Through the PCI bus, the PC87200 PCI-to-ISA bridge is built as a highly integrated PCI-to-ISA bridge solution for the best industry applications.

---

1 This option is available with Omnix backplanes only. This option must be disabled in 7000, 8000, and 9000 Series systems.

The Super I/O chip W83627HF integrates two high speed serial ports, one parallel port, an SIR interface, a Watchdog Timer (WDT) which is enabled by jumper settings and triggered by software, H/W monitoring, FDD interface, and an 8042 keyboard controller with PS/2 mouse ports. This parallel port supports one PC-compatible printer port (SPP, bi-direction), Enhanced Parallel Port (EPP), and Extended Capabilities Port (ECP).

The PCI-to-ISA bridge supports a standard 16-bit ISA bus interface. The Endeavor Plus supports the DiskOnChip (DOC) for the M-systems Flash Disk, ISA buffer driving for special I/O applications and multi-ISA slots.

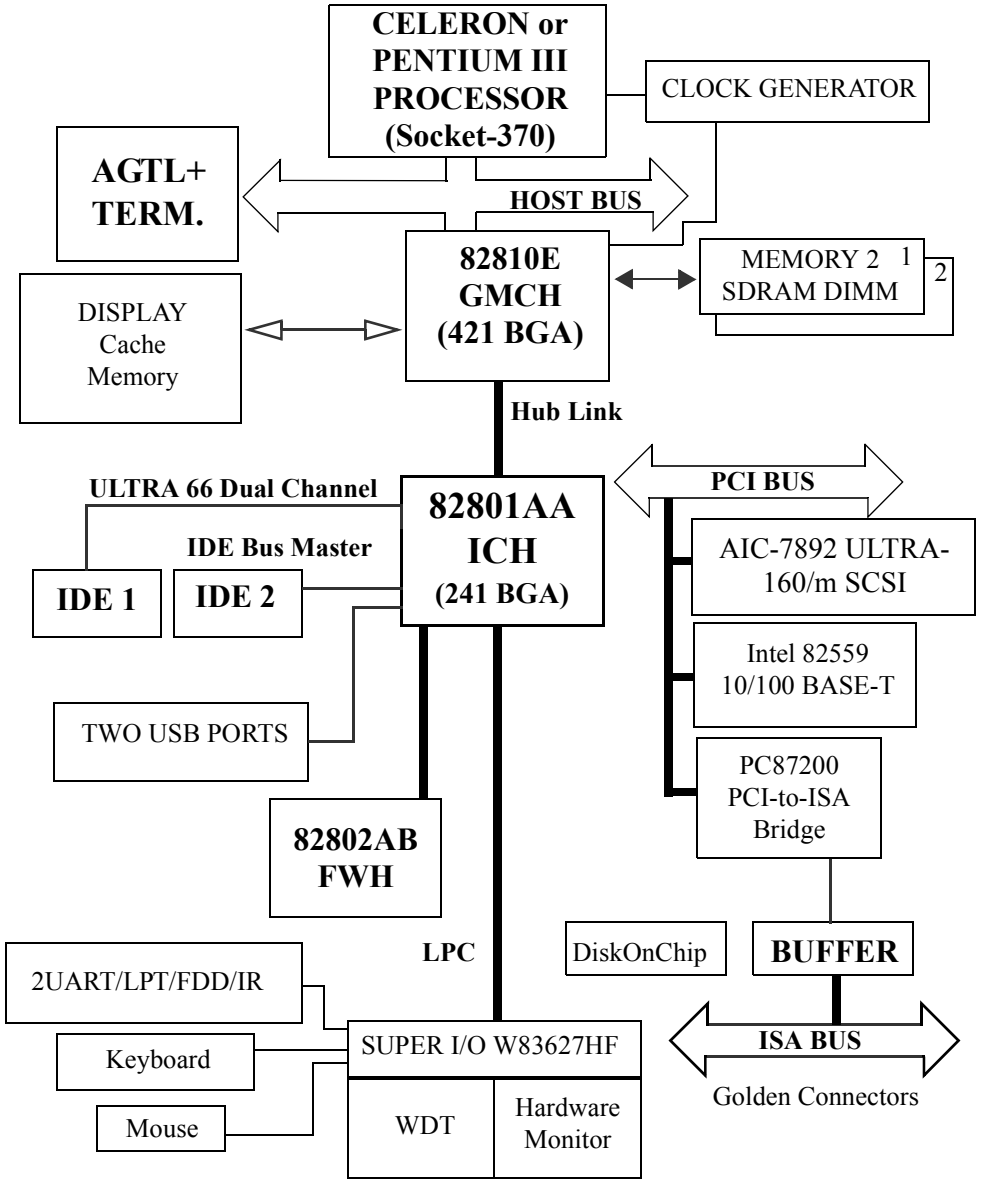
In addition, an advanced feature is used on the Endeavor Plus to support detection and monitoring of the system temperature, operating voltage, and fan status.

The 82802 Firmware Hub stores system BIOS and video BIOS, eliminating a redundant, non-volatile memory component.

There are two onboard PCI devices (VES model only): the Ultra-160/m SCSI interface and the Fast Ethernet port. These devices support the full functionality of the Endeavor Plus all-in-one single board computer. The onboard SCSI device uses an Adaptec AIC-7892B Ultra-160/m SCSI controller to support one 68-pin condensed connector with 160MB/sec maximum data transfer. The other onboard PCI device (VE and VES models only), the LAN port, is powered by the Intel 82559 10/100 Ethernet Controller supports Fast Ethernet interface through the RJ-45 port.

The 810e built-in Graphics Controller supports high end graphics accelerators. It is implemented with high performance SGRAM 4MB to support color depths and high resolution up to 1600 x 1200 with 256 colors.

System Block Diagram



Chapter 2

Hardware Settings

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Overview

This chapter provides jumper, header, and connector definitions and positions. Default settings from the factory are marked with an asterisk (*).

Jumpers

In general, jumpers on the Endeavor Plus single board computer are used to select feature options (Figure 2-1). Some jumpers are designed to be user-configurable, allowing for system enhancement. The others are used for testing purposes only and should not be altered.

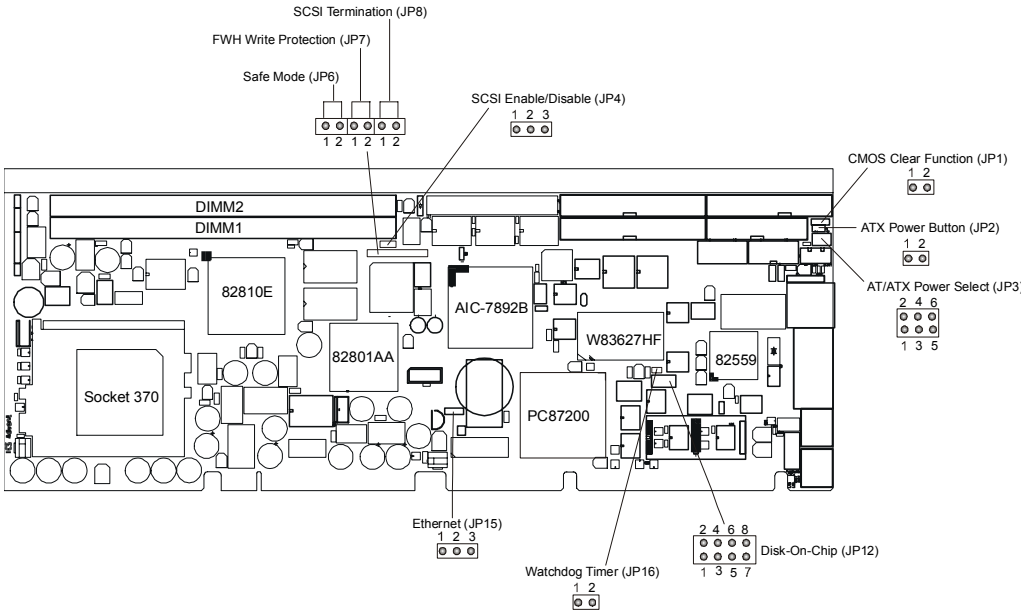

Figure 2-1. Endeavor Plus Jumper Locations

CPU Jumper Settings

Note: There is no hardware jumper for CPU core/bus ratio. This configuration is handled through the BIOS.
(Hardware Monitoring Setup Menu)

Note: To enable the Watchdog Timer (WDT), and have WDT ready for trigger, cover the jumper cap for JP16 then configure the **"Watchdog Timer** Controller**"** option in BIOS Advanced Chipset Setup to determine when the first WDT trigger should be activated. Please refer to Chapter 3 for details.

Note: The FWH (Firmware Hub) Write Protection option jumper enables/disables the BIOS chip as a flashable ROM.

Note: Refer to Chapter 3 for correct clear CMOS operation.

Note: Enabling JP6 will force the system to run with x2 core/bus ratio.

Note: Enabling JP8 will produce a SCSI termination onboard.

JP1: CMOS Clear Function NA: Normal operation* Short: Clear CMOS contents	**JP3: AT/ATX Power Select** 3-5, 4-6:Select ATX Power Supply 1-3, 2-4: Select AT Power Supply*
JP4: Onboard SCSI Enable/Disable 1-2: Enable* 2-3: Disable	**JP4: Onboard SCSI Enable/Disable** 1-2: Enable* 2-3: Disable
JP6: Safe Mode Enable/Disable Short: Enable NA: Disable*	**JP7: FWH Write Protection** Short: Disabled (flashable)* NA: Enabled (non-flashable)
JP8: SCSI Termination Short: Disable NA: Enable*	**JP12: DiskOnChip Settings** 1-2: D8000-D9FFF* 3-4: DA000-DBFFF 5-6: DC000-DDFFF 7-8: DE000-DFFFF
JP15: Onboard Ethernet Enable/Disable 1-2: Enable* 2-3: Disable	**JP16: Watchdog Timer Enable/Disable** Short: Enabled hardware WDT function NA: Disabled hardware WDT function*
JP2: ATX Power Button Interface 1: Power Button Control Signal 2: Momentary Switch Control Signal	

Connectors

Connect the optional I/O peripheral devices and the Flash disk to the following connectors and the DOC socket on the Endeavor Plus.

CAUTION

Your Endeavor Plus single board computer will be permanently damaged if you install USB cables backwards into the two-port USB connector. Refer to the drawing below for the correct orientation. Note red wires should be on opposite sides.

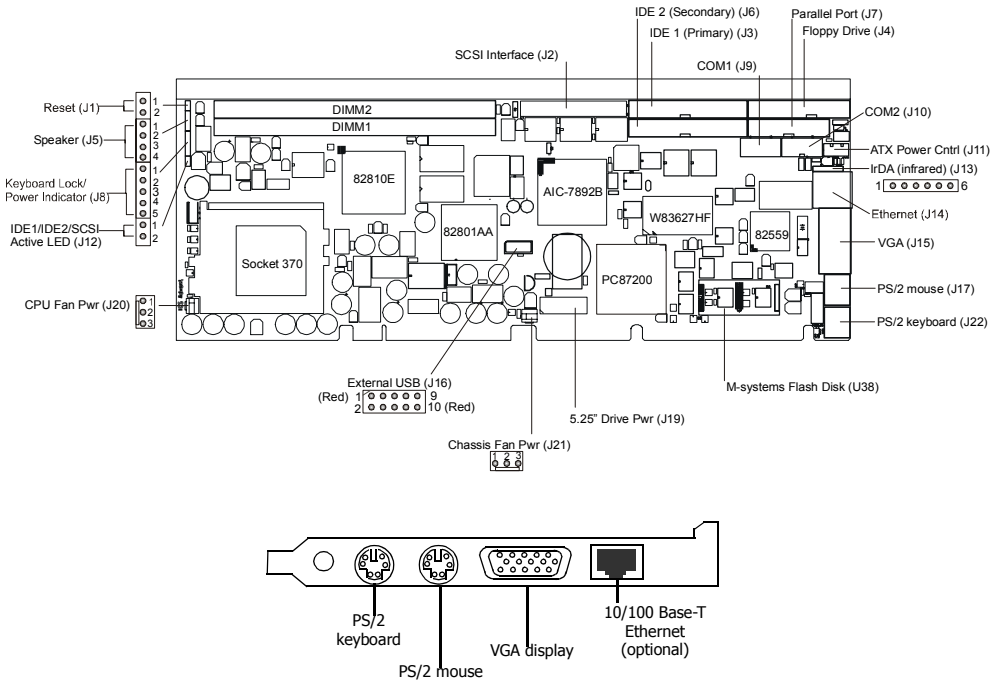

Figure 2-2. Endeavor Plus Connectors

Table 2-1. Connector Descriptions

Connector	Function	Remark
J1	System reset	
J2	Onboard Ultra-160/m SCSI interface	One 68-pin connector (VES model only)
J3	IDE 1 (Primary) interface	
J4	Floppy connector	
J5	External speaker interface	
J6	IDE2 (Secondary) interface	
J7	Parallel port connector	
J8	Keyboard lock and power indicator	
J9	COM1 serial port	2 x 5 shrouded header
J10	COM2 serial port	2 x 5 shrouded header
J11	ATX power control interface	Connect to ACPI compliant backplane
JP2	ATX power button interface	
J12	IDE1/IDE2/SCSI Active LED Header	LED Indicator
J13	IrDA (infrared) port	
J14	Onboard Ethernet interface connector	RJ-45 (VE and VES models only)
J15	Onboard VGA connector	D-SUB 15
J16	Two-port USB interface	Optional cable not included
J17	PS/2 mouse connector	6 pin Mini-DIN

Connector	Function	Remark
J18	External keyboard interface	Connect to backplane (Legacy backplane only with special cable)
J19	Standard 5.25-inch disk drive power Connector	Connect to power supply
J20	CPU Fan power connector	
J21	Chassis Fan power connector	Monitors one tach fan.
J22	PS/2 keyboard connector	6 pin Mini-DIN
U28	Socket 370 PGA/FCPGA	Celeron/P-III CPU
U38	M-system Flash Disk	DIP 32 pin chip
DIMM 1 – 2	DIMM socket	3.3V SDRAM PC 100

Pin Assignments

J1: Reset Header

Pin	Pin
1 Reset	2 Ground

J2: Ultra-160/m SCSI Connector (high density 68-pin)

Pin	Pin
1 LVDP12	2 Data 0
3 Data	4 Data 2
5 Data 3	6 Data 4
7 Data 5	8 Data 6
9 Data 7	10 Acknowledge #
11 Busy	12 Paper Empty
13 Printer Select	14 Auto Form Feed #
15 Error #	16 Initialization #
17 Printer Select IN #	18 Ground
19 Ground	20 Ground
21 Ground	22 Ground
23 Ground	24 Ground
25 Ground	26 NA
27 LVSELP	28 LVCDP
29 LVREQP	30 LVIOP
31 LVDP8	32 LVDP9
33 LVDP10	34 LVDP11
35 LVDP12	36 LVDP13
37 LVDP14	38 LVDP15
39 LVDPHM	40 LVDM0
41 LVDM1	42 LVDM2
43 LVDM3	44 LVDM4
45 LVDM5	46 LVDM6
47 LVDM7	48 LVDPLM
49 Ground	50 SENSE_A(Pull-up)
51 LVTRMPWR	52 LVTRMPWR
53 NA	54 Ground
55 LVATNM	56 Ground
57 LVBSYM	58 LVACKM
59 LVRSTM	60 LVMSGM
61 LVSELM	62 LVCDM
63 LVREQM	64 LVIOM
65 LVDM8	66 LVDM9
67 LVDM10	68 LVDM11

J3/J6: IDE 2/IDE 1 Interface Connector

Pin	Pin
1 RESET#	2 Ground
3 Data 7	4 Data 8
5 Data 6	6 Data 9
7 Data 5	8 Data 10
9 Data 4	10 Data 11
11 Data 3	12 Data 12
13 Data 2	14 Data 13
15 Data 1	16 Data 14
17 Data 0	18 Data 15
19 Ground	20 NA
21 DMA REQ	22 Ground
23 IOW#	24 Ground
25 IOR#	26 Ground
27 IOCHRDY	28 Pull-down
29 DMA ACK#	30 Ground
31 INT REQ	32 NA
33 SA1	34 NA
35 SA0	36 SA2
37 HDC CS0#	38 HDC CS1#
39 HDD Active#	40 Ground

J4: FDC Interface Controller

Pin	Pin
1 Ground	2 Density Select
3 Ground	4 NA
5 Ground	6 NA
7 Ground	8 Index#
9 Ground	10 Motor ENA#
11 Ground	12 Drive Select B#
13 Ground	14 Drive Select A#
15 Ground	16 Motor ENB#
17 Ground	18 Direction#
19 Ground	20 Step#
21 Ground	22 Write Data#
23 Ground	24 Write Gate#
25 Ground	26 Track 0#
27 Ground	28 Write Protect #
29 NA	30 Read Data #
31 Ground	32 Head Select #
33 NA	34 Disk Change #

J7: Parallel Port Connector

Pin	Pin
1 Strobe #	2 Data 0
3 Data 1	4 Data 2
5 Data 3	6 Data 4
7 Data 5	8 Data 6
9 Data 7	10 Acknowledge #
11 Busy	12 Paper Empty
13 Printer Select	14 Auto Form Feed #
15 Error #	16 Initialization #
17 Printer Select IN#	18 Ground
19 Ground	20 Ground
21 Ground	22 Ground
23 Ground	24 Ground
25 Ground	26 NA

J5: External Speaker Header

Pin
1 Speaker signal
2 NA
3 Ground
4 +5V

J8: Keyword Lock Header

Pin
1 +5V (220 ohm pull-up for power LED)
2 NA
3 Ground
4 Keyboard inhibit
5 Ground

J9/J10: Serial Port 2x5 Shrouded Connector

Pin	Pin
1 Data Carrier Detect (DCD)	2 Receive Data (RXD)
3 Transmit Data (TXD)	4 Data Term Ready (DTR)
5 Ground (GND)	6 Data Set Ready (DSR)
7 Request to Send (RTS)	8 Clear to Send (CTS)
9 Ring Indicator (RI)	10 NA

J11: ATX Power Control Connector

Pin
1 ATX Power Good Signal
2 ATX 5 V Standby
3 ATX Power On Control
4 Ground

J12: IDE 1/IDE 2/SCSI Active LED Header

Pin
1 +5V (470 ohm pull-up for HDD LED)
2 HDD Active # (LED cathode terminal)

J13: Standard IrDA Header

Pin
1 VCC (+5V)
2 IOVSB
3 IRRX
4 Ground
5 IRTX
6 NA

J14: Ethernet RJ-45 Interface Connector

Pin
1 TX+
2 TX-
3 RX+
4 Termination to Ground
5 Termination to Ground
6 RX-
7 Termination to Ground
8 Termination to Ground

J15: VGA DSUB-15 Connector

Pin
1 R
2 G
3 B
4 NA
5 Ground
6 Ground
7 Ground
8 Ground
9 NA
10 Ground
11 NA
12 MONID1
13 HSYNC
14 VSYNC
15 MONID2

J16: External USB Interface Connector

Pin	Pin
1 +5V 2NA	
3 SBD0- (USBP0-)	4 Ground
5 SBD0+ (USBP0+)	6 SBD1+ (USBP1+)
7 Ground	8 SBD1- (USBP1-)
9 NA	10 +5V

J17: PS/2 Mouse Connector (6-pin Mini-DIN)

Pin
1 Mouse Data
2 NA
3 Ground
4 +5V
5 Mouse Clock
6 NA

J18: External Keyboard Connector

Pin
1 Keyboard Clock
2 Keyboard Data
3 NA
4 Ground
5 +5V

J19: Standard 5.25-inch Disk Drive Connector

Pin	Pin
1 +12V	2 Ground
3 Ground	4 +5V

J20: CPU Fan Power Connector **Pin** 1 Ground 2 +12V 3 FAN_status (pull-up 5V)	**J21: Chassis Fan Power Connector** **Pin** 1 Ground 2 +12V 3 FAN status (pull-up 5V)
J22: PS/2 Keyboard Connector (6-pin Mini-DIN) **Pin** 1 Keyboard Data 2 NA 3 GND 4 +5V 5 Keyboard Clock 6 NA	

Chapter 3

System Installation

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Overview

This chapter describes how to set up and configure the Endeavor Plus single board computer, M-systems Flash Disk, onboard PCI devices, and the onboard Watchdog Timer (WDT).

Socket 370 Celeron/Pentium III Processor

Installing a CPU

After shutting down the system, disconnecting power, and taking the CPU board to an ESD workstation, follow the these steps:

1) Lift the lever of the CPU socket outwards and upwards to the fully open position.

2) Align the processor pins with the pin holes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place. If this operation is not easy or smooth, don't do it forcibly.

3) Push down the lever to lock the processor chip (CPU) into the socket.

4) Follow the installation guide for the CPU cooling fan or heat sink to mount the fan or heat sink on the CPU surface and lock it on the socket 370.

Removing a CPU

After shutting down the system, disconnecting power, and taking the CPU board to an ESD workstation, follow the these steps:

1) Unlock the cooling fan first.

2) Lift the lever of the CPU socket outwards and upwards to the fully open position.

3) Carefully lift up the existing CPU to remove it from the socket.

4) Follow the steps of installing a CPU to install another one, or push the handling bar down to close the opened socket.

Configuring the System Bus

Please note that the Endeavor Plus will automatically detect the system bus based on the CPU used.

Main Memory

The Endeavor Plus has two 168-pin DIMM slots that hold up to 512MB of 3.3V SDRAM. **Memory must be a PC100-compliant memory chip at a FSB clock frequency of 100MHz.**

For best compatibility, procure tested memory modules from ICS Advent. If you need to source memory from an outside vendor, choose well known suppliers such as Micron, Kingston, or Crucial. A single or double-sided DIMM can be used. The two DIMMs can be any size up to 256MB.

Ensure adequate memory module contact and lock integrity with the DIMM socket. This will impact the system reliability. Follow the normal procedure to install an SDRAM module into the memory socket. Before locking the DIMM into place, make sure that the module has been fully inserted into the DIMM slot.

Note: (1) For maintaining system stability, do not change any of the SDRAM parameters in BIOS setup to upgrade your system performance without acquiring technical information. (2) Due to the Intel 810e chipset, ECC or buffered (registered) SDRAM is not supported. If ECC SDRAM is used, the system will respond with a warning message indicating that this type of SDRAM will not benefit the system. Buffered (registered) SDRAM will simply freeze up the system if installed.

Installing the Single Board Computer

CAUTION

Be sure to take proper care electrostatic precautions **before** starting any work.

CAUTION

Ensure the single board computer is properly inserted and secured to the chassis so contacts remain in place.

To install the Endeavor Plus single board computer into a standard chassis or a proprietary environment, perform the following steps:

1) Ensure that all jumper settings are in their proper position.

2) Install and configure the CPU and memory module(s) in the right position.

3) Place the Endeavor Plus into the determined position in your system.

4) Attach cables to existing peripheral devices as appropriate and secure them to the chassis with the screw on the L-bracket.

AIC-7892 Ultra-160/m SCSI Host Adapter

The following table shows how to enable and disable the onboard Ultra-160 SCSI function using JP4. The 7892 SCSI driver is in the SCSI directory of the Endeavor Plus CD.

JP4	FUNCTION
1-2	Enable onboard SCSI
2-3	Disable onboard SCSI

Onboard Intel 810e Graphics Controller

The Intel 810e chipset is the result of a new design approach to optimize the shared memory architecture while maintaining the cost benefits of integration through Direct AGP and Dynamic Video Memory Technology.

If no additional VGA card is inserted in any of the ISA/PCI slots, the onboard Intel 810e graphics controller will provide the system display output. However, the system will, by default, switch to an external VGA adapter if one is present.

The VGA driver is in the VGA directory of the Endeavor Plus CD.

- For Windows 95/98, use the installation files in Drivers\Graphics\Win9x. Execute "setup.exe" to complete driver installation.
- For Windows NT 4.0, user the installation files in Drivers\Graphics\Winnt4. Execute "setup.exe" to complete driver installation.

Intel 82559 Fast Ethernet Controller

The following table shows how to enable and disable the onboard Intel 82559 LAN function using JP15. The 82559 LAN driver is in the Ethernet directory of the Endeavor Plus CD.

JP15	FUNCTION
1-2	Enable onboard LAN
2-3	Disable onboard LAN

Onboard LED Indicator

The Endeavor Plus has three LED indicators for LAN interface status.

LAN speed LED (left side) :
ON = 100Mbps activity
OFF = 10Mbps activity

LAN active LED (middle) :
ON = Tx/Rx activity
OFF = no activity

LAN Link Integrity LED (right side) :
ON = link is good in either 10 or 100 Mbps
OFF = link is bad

810e Chipset & ATA-66

A few hardware features of the 810e chipset are, by default, not recognized by Windows 95/98. Load the 810e INF (Incremental Fix) patches to bring up the drivers so the operating system will recognize these hardware features.

The INF driver is in the IDE/INF directory of the Endeavor Plus CD. (Note: This driver only supports Windows 95, Windows 98, and Windows 98 Second Edition). Execute “setup.exe” to complete the driver installation.

Also, the 810e chipset supports the ATA-66 mode, which requires the ATA-66 driver for the real ATA-66 to function properly. The ATA-66 driver is in the IDE directory.

After installation, simply select from the Windows Start menu as “Program / Intel Ultra ATA Storage / Companion” to bring up the user interface. Click on the device available at the left pane and it will simply prompt the corresponding device information at the right pane.

Note: (1) This driver only supports Windows 98, Windows 98 Second Edition, and Windows NT 4.0. (2) For correct operation of ATA-66, use an 80-pin IDE cable instead of a 40-pin IDE cable for IDE devices to avoid unstable performance.

Winbond Hardware Doctor Software

The hardware monitor software, “HWDOCTOR”, is provided on the CD. This software detects system information and reports it through a GUI. Information detected includes:

- CPU Vcore, Vcc1.8, Vcc3.3, and system DC voltage
- System and CPU temperature

A warning message and beeping will occur if the current reading is outside of the upper and lower boundary values. System information, may be monitored and boundary values can be configured online through the graphical user interface (GUI).

This software works with Windows 95/98 and Windows NT 4.0.

Flash BIOS

The following table shows how to enable and disable the Firmware Hub protection using JP7. To flash in a new BIOS file into the BIOS chip, disable the protection first.

JP7	FUNCTION
NA	Enable protection
Short	Disable protection

M-systems Flash Disk

The Endeavor Plus includes one 32-pin DIP socket for installing an M-systems Flash Disk from 2MB to 144MB.The DiskOnChip is not a Plug-n-Play device; its address must be manually selected using JP12. Before installing, make certain that the memory window address jumper setting **(JP12)** is set on the right position to prevent system conflicts. Follow the DOC (DiskOnChip) installation procedure below. Otherwise, the Flash chip may be damaged due to incorrect installation.

Installing DiskOnChip (DOC)

Align the DiskOnChip (DOC) with the pin holes on the socket. Ensure that the notched corner or dot mark (pin 1) of the DOC corresponds to the notched corner of the socket. Press down on the DOC gently until it fits into place. If the installation procedure is correctly performed, the Flash disk can be viewed as a normal hard disk to access read/write data.

CAUTION

Ensure that the DOC is inserted properly. Inserting the DOC backwards will damage it.

The Endeavor Plus will instruct the user to install and utilize DOC for practical application. If you want to boot from this Flash disk, refer to the application note from M-systems. You can easily get relatively advanced information from M-systems' shipping package (such as the product manual) or their Web site **http://www.m-sys.com**.

Watchdog Timer (WDT) Programming

System will reset if no retrigger signal has been given after the set time interval

Enable WDT Function

The following table shows how to enable and disable the Watchdog Timer (WDT) circuit using JP16.

JP16	FUNCTION
Short	Enable WDT
NA	Disable WDT

This will prepare the WDT circuit to be ready for the trigger. The WDT is now in standby mode. Without adding this jumper, the WDT circuit is always turned off.

Initialize, Re-trigger, and Stop WDT

With the WDT enabled, you may configure the “Watchdog Timer Controller” option in BIOS to determine when the WDT will be initialized.

Enabled = Automatically initialize WDT when booting up.
Disabled = Manually initialize WDT by software at run-time

After you initialize the WDT, the system will reboot if no re-trigger signal is given within a time-out interval.

There are two methods to program the time-out interval. One is to specify it in the BIOS (Advanced Chipset Setup) and the other is through software programming over the super I/O W83627HF chip. The first way is recommended and easier but has fewer choices of time-out intervals. BIOS provides only eight possible ranges of timeout intervals ranging from 1 second to 60 minutes. The second method is more difficult and complicated, but provides more choices of time-out intervals.

A test program is available in Appendix A, "WDT Programming". The program allows users to specify a refresh interval and the system will simply stay on if the selected refresh interval is less than the time-out interval specified in BIOS. Otherwise, the system will reboot. A programming guide is also included in Appendix A.

Clear CMOS Operation

The following table will show you how to enable and disable the CMOS Clear Function hardware circuit using JP1.

JP1	FUNCTION
NA	Normal Operation
Short	Clear CMOS

To correctly operate the Clear CMOS function, apply a jumper over JP1. This will not consume any power. Then configure the (Advanced Chipset Setup) CMOS RAM Clear Function in the BIOS to *Enabled*. Reboot the system to produce a “CMOS Check Sum Error” message and hold up the system. You may then follow the displayed message to load the BIOS default setting.

Power Switch Setup

Momentary Power Switch Setup*

To configure the single board computer to accommodate Omnix chassis with a momentary on/off switch, follow these steps:

1) Select jumper pins 3-5 and 4-6 on JP3, AT/ATX Power Select (Figure 3-1).

2) Connect JP2, ATX Power Button Interface, to the momentary power switch on the chassis.

3) Route ATX signals from the power supply to J11, ATX Power Control Connector.

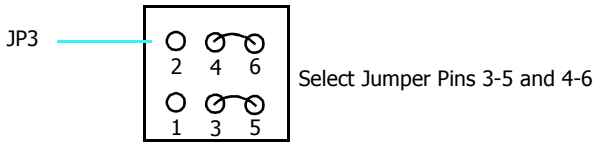

Figure 3-1. JP3, AT/ATX Power Select, Jumper Pins

* *See "Wiring Diagrams" in your chassis user's guide.*

*On/Off Power Switch Setup**

To configure the single board computer to accommodate Omnix chassis with an on/off switch, follow these steps:

1) Select jumper pins 1-3 and 2-4 on JP3, AT/ATX Power Select (Figure 3-2).

2) Make sure that JP2, ATX Power Button Interface, is not connected.

3) Make sure that J11, ATX Power Control Connector, is not connected.

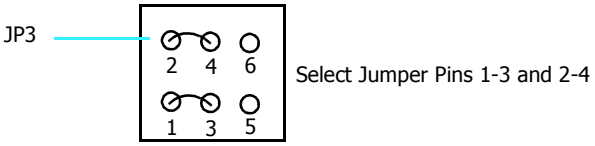

Figure 3-2. JP3, AT/ATX Power Select, Jumper Pins

* *See "Wiring Diagrams" in your chassis user's guide.*

Chapter 4

BIOS Setup Information

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Overview

The Endeavor Plus is equipped with the AMIBIOS, stored in Flash ROM. This BIOS has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When the system is turned on, the Endeavor Plus communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the Setup program. Some errors are significant enough to abort the startup.

Entering Setup

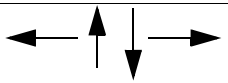
Turn on or reboot the computer. When the message “Hit [DEL] if you want to run SETUP” appears, press the [Del] key immediately to enter BIOS Setup program.

If the message disappears before you respond, but you still wish to enter Setup, please restart the system to access “COLD START” again by turning the system OFF and then ON or touch the [RESET] button. You may also restart from “WARM START” by pressing the [Ctrl+Alt+Delete] keys simultaneously. If you do not press the keys at the same time the system will not boot, and the following error message will be displayed and you will again be asked to,

```
Press [F1] to Run Setup or Resume
```

In HIFLEX BIOS Setup, the keyboard can be used to choose among options or modify the system parameters to match the options with your system. The table below will show you all of the keystroke functions in BIOS Setup.

Table 4-1. Keystroke Functions in BIOS Setup

EDITING KEYS	FUNCTION
[Tab]	Move to the next field
	Move the next field to the left, above, below, or right
[Enter]	Select in the current field
[+ / -]	Increases / Decreasess a value
[Esc]	Close the current operation and return to previous level
[PgUp]	Returns to the previous option
[PgDn]	Advances to the next option
[F2]/[F3]	Select background color
[F10]	Shows “Save current settings and exit (Y/N)” in main menu

Main Menu

Once in the Endeavor Plus AMIBIOS CMOS Setup Utility, the main menu will appear. From the main menu you can select from eleven Setup functions and two exit choices. Use the arrow keys to switch the items and press the [Enter] key to accept or enter the sub-menu.

```
AMIBIOS HIFLEX SETUP UTILITY-VERSION 1.23
(C) 1999 American Megatrends , Inc. All Rights
Reserved

Standard CMOS SETUP
Advanced CMOS SETUP
Advanced Chipset SETUP
Power Management SETUP
PCI/Plug and Play SETUP
Peripheral SETUP
Hardware Monitor SETUP
Auto-Detect Hard Disks
Change User Password
Change Supervisor Password
Auto Configuration with Optimal Settings
Auto Configuration with Fail Safe Settings
Save Settings and Exit
Exit Without Saving

Standard CMOS SETUP for changing time, date,
hard disk type, etc.
ESC : Exit ??: Sel F2/F3 : Color F10 : Save &
Exit
```

Note: Note: It is strongly recommended to reload Optimal Setting if CMOS is lost or the BIOS is updated.

Advanced CMOS Setup Reference Tables

These Setup reference tables include all of the Optimal, Failsafe, and Other Options settings in each BIOS Setup item. It is very easy to cross reference. For details, you can refer to the item description in the sub-section.

Table 4-2. Advanced CMOS Setup Defaults

BIOS Setup Items	Optimal Default	Failsafe Default	Other Options
Quick Boot	Enabled	Disabled	
1st Boot Device	IDE-0	IDE-0	IDE-1, IDE-2, IDE-3, Floppy, CDROM, ATAPI ZIP, LS-120, SCSI, SetupNetwork
2nd Boot Device	Floppy	Floppy	IDE 1, CDROM
3rd Boot Device	CDROM	CDROM	IDE-1, ATAPI ZIP
4th Boot Device	Disabled	Disabled	IDE-1, CDROM
Try Other Boot Device	Yes	Yes	No
S.M.A.R.T. for Hard Disks	Disabled	Disabled	Enabled
BootUp Num-Lock	On	On	Off
PS/2 Mouse Support	Enabled	Enabled	Disabled
System Keyboard	Absent	Absent	Present
Primary Display	VGA/EGA	Absent	VGA/EGA, Mono

Table 4-2. Advanced CMOS Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Password Check	Setup	Setup	Always
Boot To OS/2 > 64MB	No	No	Yes
L1 Cache	WriteBack	WriteBack	WriteThru, Disabled
L2 Cache	WriteBack	Disabled	WriteThru
System BIOS Cacheable	Enabled	Disabled	
C000, 16K Shadow	Cached	Cached	Enabled, Disabled
D000, 16K Shadow	Disabled	Disabled	Cached, Enabled

Table 4-3. Advanced Chipset Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
USB Function	Disabled	Disabled	Enabled
USB Keyboard Legacy Support	Enabled	Enabled	Disabled
DRAM Page Closing Policy	Closed	Closed	Open
Memory Hole	Disabled	Disabled	15MB-15MB
DRAM Tras/Trc Cycle Time	5/7	5/7	6/8
Address Setup Time (SCLKs)	1s	1	0
CAS# Latency	3 SCLKs	3 SCLKs	2 SCLKs
SDRAM RAS# to CAS# delay	2 SCLKs	2 SCLKs	3 SCLKs
SDRAM RAS# Precharge	2 SCLKs	2 SCLKs	3 SCLKs
Graphics Mode Select	UMA 1MB	UMA 1MB	UMA 512MB
Display Cache Window Size	64MB	64MB	32MB
ICH Delayed Transaction	Disabled	Disabled	Enabled
Local Memory Frequency	100 Mhz	100 Mhz	133 Mhz

Table 4-4. Display Cache Function			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Initialize Display Cache Memory	Enabled	Enabled	Disabled
Paging Mode Control	Open	Open	Close
RAS-to-CAS	Default	Default	Override
CAS Latency	Slow	Slow	Fast
RAS Timing	Slow	Slow	Fast
RAS Precharge Timing	Slow	Slow	Fast
Watch Dog Timer Controller	Disabled	Disabled	Enabled
Watch Dog Timer Setting	8 sec.	8 sec.	16 ,32 sec., 1,10,30,60 min.
CMOS RAM Clear Function	Disabled	Disabled	Enabled

Table 4-5. Power Management Setup Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
ACPI Standard State	Disabled	S1/POS	S3/STR
Power Management / APM	Disabled	Disabled	
Video Power Down Mode	Suspend	Disabled	Stand By
Hard Disk Power Down Mode	Stand By	Disabled	Stand By
Standby Time Out (Minutes)	Disabled	Disabled	1, 2, 4, 8, 10, 20, 30, 40, 50, 60 Min.
Suspend Time Out (Minutes)	Disabled	Disabled	1, 2, 4, 8, 10, 20, 30, 40, 50, 60 Min.
Throttle Slow Clock Ratio	50 %	50 %	12.5%, 25%, 37.5%, 62.5%, 75%, 87.5%
Keyboard & PS/2 Mouse Access	Monitor	Monitor	Ignore
FDC/LPT/COM Ports Access	Monitor	Monitor	Ignore
Primary Master IDE Access	Monitor	Monitor	Ignore
Primary Slave IDE Access	Ignore	Ignore	Monitor
Secondary Master IDE Access	Monitor	Monitor	Ignore

Table 4-5. Power Management Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Secondary Slave IDE Access	Ignore	Ignore	Monitor
PIRQ[A] IRQ Active	Ignore	Ignore	Monitor
PIRQ[B] IRQ Active	Ignore	Ignore	Monitor
PIRQ[C] IRQ Active	Ignore	Ignore	Monitor
PIRQ[D] IRQ Active	Ignore	Ignore	Monitor
Power Button Function	On / Off	On / Off	Suspend
Resume On Ring	Enabled	Enabled	Disabled
PME Function Support	Disabled	Disabled	Enabled
Resume On RTC Alarm	Disabled	Disabled	Enabled
RTC Alarm Date	15	15	1-14, 16-31
RTC Alarm Hour	12	12	0-11, 13-23
RTC Alarm Minute	30	30	0-29, 31-59
RTC Alarm Second	30	30	0-29, 31-59

Table 4-6. Peripheral Setup Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
OnBoard IDE	Both	Both	Primary, Secondary, Disabled
OnBoard FDC	Auto	Auto	Enabled, Disabled
OnBoard Serial Port A	Auto	Auto	3F8h/COM1, 2F8h/COM2, 3E8h/COM3, 2E8h/COM4, Disabled
Onboard Serial Port B	Auto	Auto	3F8h/COM1, 2F8h/COM2, 3E8h/COM3, 2E8h/COM4, Disabled
Serial Port B Mode	Normal	Normal	IrDA 1.6us, ASK-IR, IrDA 3/16 Baud
IR Duplex Mode	Half Duplex	Half Duplex	Full Duplex
IR Pin Select	IRRX/IRTX	IRRX/IRTX	SINB/SOUTB
Onboard Parallel Port	Auto	Auto	Disabled, 378h, 278h, 3BCh
Parallel Port Mode	Bi-Dir	Bi-Dir	EPP, ECP, Normal

Table 4-6. Peripheral Setup Defaults (Continued)			
BIOS Setup Items (Continued)	**Optimal Default**	**Failsafe Default**	**Other Options**
EPP Version	N/A	N/A	1.7 , 1.9
Parallel Port IRQ	Auto	Auto	
Parallel Port DMA Channel	N/A	N/A	Auto
Mouse Power On Function	Disabled	Disabled	Left-button, Right-button
Keyboard Power On Function	Disabled	Disabled	Any key, Power Key, Specific Key
Specific key for Power On	N/A	N/A	Password

Table 4-7. PCI/PnP Setup Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Primary Graphics Adapter	Add-on VGA	Add-on VGA	OnBoard VGA
PCI VGA Palette Snoop	Disabled	Disabled	Enabled
PCI IDE BusMaster	Disabled	Disabled	Enabled
PCI Slot1 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot2 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot3 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot4 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
DMA Channel 0	PnP	PnP	ISA/ EISA
DMA Channel 1	PnP	PnP	ISA/ EISA
DMA Channel 3	PnP	PnP	ISA/ EISA
DMA Channel 5	PnP	PnP	ISA/ EISA
DMA Channel 6	PnP	PnP	ISA/ EISA
DMA Channel 7	PnP	PnP	ISA/ EISA
IRQ3	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ4	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ5	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ7	PCI/ PnP	PCI/ PnP	ISA/ EISA

Table 4-7. PCI/PnP Setup Defaults (Continued)			
BIOS Setup Items (Continued)	**Optimal Default**	**Failsafe Default**	**Other Options**
IRQ9	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ10	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ11	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ12	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ14	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ15	PCI/ PnP	PCI/ PnP	ISA/ EISA

Table 4-8. Hardware Monitor Setup Defaults

BIOS Setup Items	Optimal Default*	Failsafe Default	Other Options
CPU Ratio Selection	**5.0x**	**2.0x (Safe)**	**3-4.5x, 5.5-8x**
**** System Hardware Monitor ****			
Current CPU Temperature			
Current System Temperature			
Current CPU Fan Speed			
Current Chassis Fan Speed			
CPU VID			
Vcore			
Vcc1.8			
Vcc3.3			
+ 5.000V			
+12.000V			
-12.000V			
- 5.000V			
Vbat			
+5V SB			

* *Optimal default depends on the CPU and is set to Auto detect*

Standard CMOS Setup Menu

This Setup page includes all the items in a standard compatible BIOS. Use the arrow keys to highlight the item and then use the [PgUp]/[PgDn] or [+/-] keys to select the value or number you want in each item and press the [Enter] key to certify it.

Follow the command keys in the CMOS Setup tables to change **Date**, **Time**, **Drive type**, and **Boot Sector Virus Protection Status**.

Advanced CMOS Setup Menu

This Setup includes all of the advanced features in the system. The detailed descriptions are specified below.

Quick Boot

Select *Disabled* for normal booting, or for quicker booting, select *Enabled,* to skip minor BIOS test items.

Boot Up Sequence

Six items determine which drive the computer searches for to find the Disk Operating System (DOS).

The default ARMD (ATAPI Removable Media Device) emulation type is set to popular drive type LS-120 and ATAPI ZIP. There are many devices available to boot up the system: *Disabled*, *IDE-0*, *IDE-1*, *IDE-2*, *IDE-3*, *Floppy*, *LS-120*, *ATAPI ZIP*, *CD-ROM*, *SCSI*, and *NETWORK*.

Boot Up Num-Lock

Select *On* to enable the numeric function of the numeric keypad, or *Off* to disregard it.

PS/2 Mouse Support

Select *Enabled* to enable the PS/2 mouse function, or *Disabled* to make the IRQ12 interrupt available to other ISA-bus I/O devices.

System Keyboard

This option is used to override a keyboard error message. Choose the *Absent* setting in BIOS Setup when the system has no keyboard attached.

Primary Display

Choose *Absent*, *VGA/EGA*, *CGA40x25*, C*GA80x25*, or *Mono* to set your monitor type. If you select Absent, the "CMOS Display Type Wrong" message will be ignored despite the mismatched display card.

Password Check

This option checks the system during boot up or CMOS Setup. It only takes effect after changing the setting *Supervisor Password*.

- Entering the current user password in "Change User Password" will force the system to check the password before running Setup. The system will be able to boot, but will deny access to Setup.
- The password prompt appears every time the system boots up. The system will not boot and will deny access to Setup with an invalid password. Clear CMOS or try reloading BIOS Setup to boot up the system.

Boot to OS/2>64MB

Set this option to *Yes* to support the OS/2 environment.

L1 Cache

This option turns the CPU's Level 1 built-in cache on or off.

L2 Cache

This option turns the CPU's Level 2 built-in cache on or off.

System BIOS Cacheable

This option enhances the system's performance by shadowing and caching the system BIOS. When disabled, this BIOS shadow function will be ignored.

Shadow Memory

Each segment provides three options for a faster adapter's ROM execution: *Disabled*, *Enabled*, and *Cached*. This shadow function is chipset-oriented and depends on your system's hardware features. In general, C000 64K will be allocated for VGA BIOS and set to *Cached* to get higher display performance by shadowing and caching feature. If you choose the *Enabled* setting, only the BIOS shadow function is active.

Advanced Chipset Setup Menu

This Setup is very important to maintain system stability. If you are not a technical person, do not attempt to change any parameters. The optimal default setting is recommended.

USB Function

This option enables the on-chip Universal Serial Bus (USB) function to support the USB peripheral devices when the *Enabled* setting is selected.

USB Keyboard Legacy Support

This option is only available when the USB Function option is set to *Enabled.* Enabling this option provides support for a USB keyboard without the auxiliary driver in the DOS environment.

DRAM Page Closing Policy

This option controls whether the graphics and memory controller hub will pre-charge one or all banks after a page miss.

Memory Hole

This option allows the end user to specify the location of a memory hole for memory space requirements from ISA-bus cards.

DRAM Tras/Trc Cycle Time (SCLKs)

This option controls the number of SDRAM clocks (SCLKs) used per access cycle.

Address Setup Time (SCLKs)

This option controls the SDRAM address Setup delay time.

CAS# Latency (SCLKs)

This option controls the number of SCLKs between the time a read command is sampled by the SDRAMs and the time the GMCH samples transfer the data from the SDRAMs.

SDRAM RAS# to CAS# delay (SCLKs)

This option controls the number of SCLKs (SDRAM Clocks) from a row that activate a command to Read or Write. If your system has good quality SDRAM, you can set this option to 2 *SCLKs* to obtain better memory performance. Normally, the option is set to 2 *SCLK*s.

SDRAM RAS# Precharge

This option controls the number of SCLKs for RAS# precharge. If your system installs good quality SDRAM, you can set this option to 2 SCLKs to obtain better memory performance.

Graphics Mode Select

This option selects memory space that is used by the video BIOS for handling support of VGA when no GMCH graphics driver is present (e.g., a DOS boot).

Display Cache Window Size

This option allows you to select the size of mapped memory for AGP graphical data.

ICH Delayed Transaction

Choose the *Enabled* option to obtain higher PCI bus performance for I/O controllers and bridges in the system.

ClkGen Spread Spectrum

This option turns the spread spectrum for EMI control on or off.

Local Memory Frequency

This option selects the operating frequency for the Local Memory Controller.

Initialize Display Cache Memory

This option enables or disables Display Cache Memory.

Paging Mode Control

This option controls the GMCH memory controller, which tends to close open pages.

RAS-to-CAS

This option indicates the RAS#-to-CAS# delay in units of display cache clock periods.

CAS# Latency

This option selects clock periods in units of local memory.

RAS# Timing

This option controls the RAS# active to precharge, and refresh to RAS# active delay.

RAS# Precharge Timing

This option controls the RAS# precharge in local memory clocks.

Watchdog Timer Controller (WDT)

This option turns the Watchdog Timer on or off.

Watchdog Timer Setting

This option selects the WDT Timeout Interval Setting.

CMOS RAM Clear Function

If your system supports Y2K RTC, set this option to *Enabled* to support hardware CMOS clearing operation.

Power Management Setup Menu

This APM (Advanced Power Management) determines how much power can be saved by setting the items below to handle the system power resource. The following descriptions specify the definition of each item in detail.

ACPI Standby State

This option supports ACPI standby state S1(POS) and S3(STR) and is not supported by Legacy backplanes.

S1 Sleeping State

Places the processor into the STPCLK grant state.Throttles the processor's input clock to run the duty cycle (See **Throttle Slow Clock Ratio**), placing the processor into the stop clock state. The system clocks (PCI and CPU) continue to run during the sleeping state. Any wakeup event should cause the hardware to de-assert the STPCLK# signal to the processor.

S3 Sleeping State

All devices on the computer are turned off except for the system RAM.

Power Management/APM

Advanced Power Management (APM) controls the system's power resources. Set this option to *Enabled* to enable the power management function. It will operate based on parameter settings. This option is not supported by Legacy backplanes.

Video Power Down Mode

This option activates the power-conserving state that the VESA VGA video subsystem enters after the specified period of display inactivity.

Hard Disk Power Down Mode

This option specifies the power management state that the HDD enters after the specified period of hard drive inactivity. This is similar to the video power control function. If the user chooses *Standby* or *Suspend*, it will depend on the period specified in the parameters *Standby Timeout* or *Suspend Timeout*.

Standby Time out (Minutes)

This option specifies the length of time the system is inactive while the computer is in its full-on power state before the computer is placed in Standby mode. When this time expires, the computer enters *Standby Timeout* state. In *Standby* mode, some power use is curtailed.

Suspend Timeout (Minutes)

This option is the same as the *Standby Timeout* function. These two features must monitor the power of sub-items *Display Activity*, *Serial Port*, *Parallel Port*, *Floppy*", *Pri-HDD*, and *Sec-HDD* independently. It is also used to control the CPU throttle running function. None of the sub-items will operate when either Stanby Timeout or Suspend Timeout are disabled, even if they are selected in the BIOS Setup menu.

Throttle Slow Clock Ratio

This option indicates whether the speed at which the system clock runs in system power-saving modes. The settings are expressed as a duty cycle of the STPCLK# signal. This duty cycle indicates the percentage of time the STPCLK# signal is asserted in the throttle mode.

Display Activity

This option specifies if the BIOS is set to monitor activity on the display monitor for power conservation purposes. If it is set to *Monitor* and the computer is in a power saving state, BIOS watches for video display activity. The computer enters the full-on power state if any activity occurs. BIOS reloads the *Standby* and *Suspend* timeout timers if activity occurs on the specified IRQ lines. If set to *Ignore*, video display monitor activity is not monitored.

Keyboard & PS/2 Mouse, FDC/LPT/COM Ports, Pri/Sec HDD Access

When set to *Monitor*, these options enable event monitoring on the specified hardware device. If set to *Monitor* and the computer is in a power saving state, BIOS watches for activity on the device with the specified IRQ line. The computer enters the full-on power state if any activity occurs. BIOS reloads the *Standby* and *Suspend* timeout timers if activity occurs on the specified device. No monitoring activity occurs if the option is set to *Ignore*. The settings for each of these options are *Monitor* or *Ignore*.

PIRQ [A/B/C/D] IRQ Active

When set to *Monitor*, these options enable event monitoring on the specified IRQ. If set to *Monitor* and the computer is in a power saving state, BIOS watches for activity on the device with the specified IRQ line. The computer enters the full-on power state if any activity occurs. BIOS reloads the *Standby* and *Suspend* timeout timers if activity occurs on the specified IRQ. No monitoring activity occurs if the option is set to *Ignore*. The settings for each of these options are *Monitor* or *Ignore*.

Power Button Function

This item is used to handle Soft Power On/Off regardless of time counting (generally speaking, it is 4 sec) if you set it to on/off. You can easily turn the system on/off by pressing the power button (toggle switch) directly. This feature is only available on a system with an ATX power control interface. If a standard AT power supply is used, this option will be ignored. However, if you choose the *Suspend* setting, the system will be forced into suspend mode when you turn it off, unless you can continuously press the power button for more than 4 seconds to access the Soft Off function.

Resume On Ring

This item will be used to wake up the system from the remote ringing control under the Soft Off function. If you choose the *Disabled* setting, the system will not be resumed by a modem ring.

PME Function Support

Enable this option to allow your computer to be booted from another computer via a network, by sending a wake-up frame or signal.

Resume On RTC Alarm

This option controls an unattended or automatic system power up.

- RTC Alarm Date
- RTC Alarm Hour
- RTC Alarm Minute
- RTC Alarm Second

PCI/Plug-n-Play (PnP) Setup

This section describes configuring the PCI bus system. PCI (Peripheral Component Interconnect) is a system which allows I/O devices to operate at speeds nearing the CPU's speed when they communicate with their own special components.

All of the options described in this section are important and technically complex. It is strongly recommended that only experienced users make changes to the default settings.

Plug-n-Play Aware O/S

Set this option to "Yes" if the operating system installed in the computer is Plug-n-Play aware. BIOS only detects and enables PnP ISA adapter cards that are required for system boot. The Windows 95 operating system detects and enables all other PnP-aware adapter cards. Windows 95 is PnP-aware. Set this option to "No" if the operating system (such as DOS, OS/2, Windows 3.x) does not use PnP. **You must set this option correctly or PnP-aware adapter cards installed in your computer will not be configured properl**y.

Clear NVRAM

This option is used to clear NVRAM and to check or update ESCD (Extended System Configuration Data) data after a System Power On. Set this option to "No"; it will not clear NVRAM. The operation of update ESCD is effective in a different ESCD data comparision. If you select the "Yes" setting, the BIOS will update ESCD each time the system powers on.

PCI Latency Timer (PCI Clocks)

This option is used to control the PCI latency timer period (follow the PCI clocks). Based on PCI specification 2.1 or later and the PCI bus frequency in the system, users can select different timers to meet their PCI bus environment.

Primary Graphics Adapter

This option allows you to specify a primary VGA display from two options: Onboard VGA or a PCI VGA card.

PCI VGA Palette Snoop

Some display cards that are nonstandard VGA, such as graphics accelerators or MPEG video cards, may not show colors properly. Choose the *Enabled* setting to correct this display mis-match problem. The computer requires VGA palette snooping to support any ISA adapter card installed.

PCI IDE BusMaster

Set this option to *Enabled* to specify that the IDE controller on the PCI local bus has a bus-mastering capability.

PCI Slot 1/2/3/4 IRQ Priority

These options specify the IRQ priority to be used for any PCI devices installed in PCI expansion slots 1 through 4. The settings are (IRQ) *3*, *4*, *5*, *7*, *9*, *10*, *11, and Auto* (AMIBIOS automatically determines the IRQ priority).

DMA Channel 0/1/3/5/6/7|

These options specify whether the named DMA channel is available for use on the ISA/EISA bus or PnP (Plug-n-Play).

IRQ 3/4/5/7/9/10/11/12/14/15

These options specify the bus that the named interrupt request lines (IRQs) are used on. These options allow you to specify IRQs for use by legacy ISA adapter cards. These options determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use the PCI/PnP Setup to remove the IRQ by assigning the option to the ISA/EISA setting. All IRQs used by onboard I/O are configured as PCI/PnP.

Peripheral Setup

This section describes I/O resource assignments for all onboard peripheral devices.

Onboard IDE

This option specifies the onboard IDE controller channels that will be used. The settings are *Disabled*, *Primary*, *Secondary*, and *Both*.

Onboard FDC

If you want to install a different add-on super I/O card to connect floppy drives, set this field to *Disabled*. Otherwise, set it to *Auto* to have BIOS automatically determine if the floppy controller should be enabled.

Onboard Serial Port A/Port B

These fields control the resource assignments of two onboard serial interfaces SIO1 and SIO2. The following lists show current options in Onboard Serial Port A/ Port B :

Auto → cannot set serial I/O resources by manual operation
Disabled → indicates onboard COM port function is ineffective
3F8h/COM1 → assign I/O address 3F8h to COM1
2F8h/COM2 → assign I/O address 2F8h to COM2
3E8h/COM3 → assign I/O address 3E8h to COM3
2E8h/COM4 → assign I/O address 2E8h to COM4

Serial Port B Mode

This option controls the resource assignments of onboard Serial Port B. The Serial Port B Mode Select has four settings: *Normal*, *IrDA 1.6us*, *IrDA 3/16 Baud*, and *ASK IR*.

IR Duplex Mode

IR Duplex Mode has two settings: Half Duplex and Full Duplex.

IR Pin Select

IR Pin Select has two options: IRRX/IRTX and SINB/SOUTB.

Onboard Parallel Port

There are four optional parallel port modes used to control the onboard parallel port interface when the user selects the I/O base address manually: Parallel Port Mode, EPP Version, Parallel Port IRQ, and Parallel Port DMA Channel. The following are available options of the onboard parallel port:

Auto → user can not control all of LPT port I/O resources
Disabled → onboard parallel port function is ineffective and NA
378h → locate IRQ7 for this default I/O address
278h → assign this I/O address to LPT1
3BCh → assign this I/O address to LPT1

Parallel Port Mode:

This option specifies the Parallel Port Mode. ECP and EPP are both bi-directional data transfer schemes that adhere to the IEEE P1284 specifications. This Parallel Port Mode includes four options: *Normal*, *Bi-Dir*, *EPP*, and *ECP*.

Table 4-9. Parallel Port Settings

Setting	Description
Normal	Uni-directional operation at normal speed
Bi-Dir	Bi-directional operation at normal speed
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specification. EPP uses the existing parallel port signals to provide asymmetric bi-directional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specification. ECP uses the DMA protocol to achieve data transfer rates up to 2.5MB per second. ECP provides symmetric bi-directional communication.

EPP Version :

This option is only valid if the **Parallel Port Mode** option is set to EPP. This option specifies the version of the Enhanced Parallel Port specification that will be used by AMIBIOS.

Parallel Port IRQ :

This option is only valid if the **Onboard Parallel Port** option is not set to *Disabled*. This option sets the IRQ used by the parallel port.

Parallel Port DMA Channel :

This option is only available if **Onboard Parallel Port** is set to a fixed I/O address and the setting of **Parallel Port Mode** is ECP. This option sets the DMA channel used by an ECP-capable parallel port.

Mouse/Keyboard Power On Function

This option enables either a mouse click or keystroke to power up the computer in Soft Off mode.

Hardware Monitor Setup

This Setup describes current system status detected by the hardware monitor controller. The status showed on the screen will include:

- CPU Ratio Selection
  - **This option is for unlocked processors only.** If your socket 370 processor's Frequency Multiple is locked, setting the Frequency Multiple here will have no effect. This option sets the Frequency Multiple between the CPU's internal and external frequencies. This must be set in conjunction with **CPU Bus Frequency** to match the speed of your CPU.
- Current System Temperature (Generally indicates the inside temperature of the chassis or surface temperature of the SBC)
- Current CPU Fan Speed
- Current Chassis Fan Speed, if connected to a tach fan
- System operating voltage (choices include "CPU Vcore", "CPU Vtt", "Vcc3", "+5V", "+12V", "-12V", and "-5V".)

BIOS POST Check Point List

AMIBIOS provides all IBM standard Power On Self Test (POST) routines as well as enhanced AMIBIOS POST routines. The POST routines support CPU internal diagnostics. The POST checkpoint codes are accessible via the Manufacturing Test Port (I/O port 80h).

Whenever a recoverable error occurs during the POST, the system BIOS will display an error message describing the message and explaining the problem in detail so that the problem can be corrected.

During the POST, the BIOS signals a checkpoint by issuing one code to I/O address 80H. This code can be used to establish how far the BIOS has executed through the power-on sequence and what test is currently being performed. This is done to help troubleshoot a faulty system board.

If the BIOS detects a terminal error condition, it will halt the POST process and attempt to display the checkpoint code written to port 80H. If the system hangs before the BIOS detects the terminal error, the value at port 80H will be the last test performed. In this case, the terminal error cannot be displayed on the screen. The following POST checkpoint codes are valid for all AMIBIOS products with a core BIOS date of 07/15/95 version 6.27 (Enhanced).

Uncompressed Initialization Codes

The uncompressed initialization checkpoint hex codes are listed in order of execution:

Table 4-10.Uncompressed Initialization Codes

Code	Description
D0	NMI is disabled. CPU ID saved. INIT code check sum verification will be started.
D1	Initializing the DMA controller, performing the keyboard controller BAT test, starting memory refresh, and going to 4GB flat mode.
D3	Beginning memory sizing.
D4	Returning to real mode. Executing any OEM patches and setting the stack next.
D5	Passing control to the uncompressed code in shadow RAM at E000:0000h. The INIT code is copied to segment 0 and control will be transferred to segment 0.
D6	Control is in segment 0. Next, checking that [Ctr+Home] was pressed and verifying the system BIOS check sum. If either [Ctrl+Home] was pressed or the system BIOS checksum is bad, go to checkpoint code E0h. Otherwise, go to checkpoint code D7h.
D7	Passing control to interface module.
D8	Main BIOS runtime code is to be decompressed.
D9	Passing control to the main system BIOS in shadow RAM.

Bootblock Recovery Codes

The bootblock recovery checkpoint hex codes are listed in order of execution:

Table 4-11.Bootblock Recovery Codes

Code	Description
E0	The onboard floppy controller, if available, is initialized. Beginning the base 512kB memory test.
E1	Initializing the interrupt vector table.
E2	Initializing the DMA and Interrupt controllers.
E6	Enabling the floppy drive controller and Timer IRQs. Enabling internal cache memory.
ED	Initializing the floppy drive.
EE	Looking for a diskette in drive A: and reading first sector of the diskette.
EF	A read error occurred while reading the floppy disk in drive A: .
F0	Searching for the AMIBOOT.ROM file in the root directory.
F1	The AMIBOOT.ROM file is not in the root directory.
F2	Reading and analyzing the floppy diskette FAT to find the clusters occupied by the AMIBOOT.ROM file.
F3	Begin reading AMIBOOT.ROM file, cluster by cluster.
F4	The AMIBOOT.ROM file is not the correct size.
F5	Disabling internal cache memory.
FB	Detecting the type of Flash ROM.
FC	Erasing the Flash ROM.
FD	Programming the Flash ROM
FF	Flash ROM programming was successful. Restarting the system BIOS.

Uncompressed Initialization Codes

The following runtime checkpoint hex codes are listed in order of execution. These codes are uncompressed in F0000h shadow RAM.

Table 4-12.Uncompressed Initialization Codes

Code	Description
03	The NMI is disabled. Checking for a soft reset or a power on condition.
05	The BIOS stack has been built. Disabling cache memory.
06	Uncompressing the POST code.
07	Initializing the CPU and the CPU data area.
08	The CMOS checksum calculation.
0B	Performing any required initialization before the keyboard BAT command is issued.
0C	The keyboard controller input buffer is free. Issuing the BAT command to the keyboard controller.
0E	The keyboard controller BAT command result has been verified. Performing any necessary INIT after the K/B controller BATcommand test.
0F	The keyboard command byte is written.
10	Issuing pins 23 and 24 for blocking and unblocking commands.
11	Checking if the [End] or [Ins] keys were pressed during power on.
12	To initialize CMOS if the *initialize CMOS RAM in every boot* is set or the [End] key is pressed. Disabling DMA and Interrupt controllers.
13	The video display has been disabled. Port B has been initialized. Initializing the chipset.
14	The 8254 timer test.
19	The 8254 timer test is over. Starting the memory refresh test.

Table 4-12.Uncompressed Initialization Codes (Continued)	
Code	**Description**
1A	The memory refresh line is toggling. Checking the 15us on/off time.
23	Reading the 8042 input port and disabling the MEGAKEY Green PC feature. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24	The configuration or Setup required before interrupt vector initialization has completed. Interrupt of vector initialization is about to begin.
25	Interrupt vector initialization is done. Clearing the password if the POST DIAG switch is on.
27	Any initialization before setting video mode.
28	Going for monochrome mode and color mode settings.
2A	Bus initialization system, static, output devices, if present.
2B	Passing control to the video ROM to perform any required configuration before the video ROM test.
2C	To look for optional video ROM and transfer control.
2D	The video ROM has returned control to BIOS POST. Performing any required processing after the video ROM had control.
2E	Completed post-video ROM test processing. If the EGA/VGA controller is not found, perform the display memory read/write test.
2F	EGA/VGA not found. Display memory R/W test is about to begin.
30	Display memory R/W test passed. Look for retrace checking.
31	Display memory R/W test or retrace checking failed. Perform alternate display retrace checking.
32	Alternate display memory R/W test passed. Look for the alternate display retrace checking.
34	Video display test is over. Setting the display mode.

Table 4-12.Uncompressed Initialization Codes (Continued)	
Code	**Description**
37	The display mode is set. Displaying the power on message.
38	Initializing the bus input, IPL, and general devices, if present.
39	Displaying bus initialization error message.
3A	The new cursor position has been read and saved. Displaying the “Hit [DEL]” message.
40	Preparing the descriptor tables.
42	Entering protected mode for the memory test.
43	Entered protected mode. Enabling interrupts for diagnostics mode.
44	Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0.
45	Data initialized. Checking for memory wrap-around at 0:0 and finding the total system memory size.
46	The memory wrap-around test has been completed. The memory size calculation has been done. Writing patterns to test memory.
47	The memory pattern has been written to extended memory. Writing patterns to the base 640 kB memory test.
48	Patterns written in base memory. Determining the amount of memory below 1MB.
49	The amount of memory below 1MB has been found and verified. Determining the amount of memory above 1MB memory.
4B	The amount of memory above 1MB has been found and verified. Checking for a soft reset and clearing the memory below 1MB for the soft reset. If this is a power on situation, go to checkpoint 4Eh next.
4C	The memory below 1MB has been cleared via a soft reset. Clearing the memory above 1MB.

Table 4-12.Uncompressed Initialization Codes (Continued)	
Code	**Description**
4D	The memory above 1MB has been cleared via soft reset. Saving the memory size. Going to checkpoint 52h.
4E	The memory test started, but not as the result of a soft reset. Displaying the first 64kB memory size.
4F	Memory size display started. This will be updated during the memory test. Performing the sequential and random memory test.
50	Memory testing/initialization below 1MB completed. Adjust displayed memory size for relocation and shadowing.
51	The memory size display was adjusted for relocation and shadowing. Testing the memory above 1MB.
52	The memory above 1MB has been tested and initialized. Saving the memory size information.
53	The memory size information and the CPU registers are saved. Entering real mode.
54	Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI.
57	The A20 address line, parity, and the NMI are disabled. Adjusting the memory size depending on relocation and shadowing.
58	The memory size was adjusted for relocation and shadowing. Clearing the “Hit [DEL]” message.
59	The “Hit [DEL]” message is cleared. The “[WAIT…]” message is displayed. Starting the DMA and interrupt controller test.
60	The DMA page register test passed. DMA#1 base register test.
62	DMA#1 base register test passed. DMA#2 base register test.
65	DMA#2 base register test passed. To program DMA unit 1 and 2.
66	DMA unit 1 and 2 programming over. Initializing the 8259 interrupt controller.

Table 4-12.Uncompressed Initialization Codes (Continued)	
Code	**Description**
7F	Extended NMI sources enabling is in progress.
80	The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command.
81	A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command.
82	The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer.
83	Command byte written, Global data initialization done. Check for locked key.
84	Locked key checking is over. Checking for a memory size mismatch with CMOS RAM data.
85	The memory size check is done. Displaying a soft error and checking for a password or bypassing Setup.
86	Password checked. About to do programming before Setup.
87	The programming before Setup has completed. Uncompressing the Setup code and executing the AMIBIOS Setup utility.
88	Returned from CMOS Setup program and screen is cleared. Programming after Setup.
89	The programming after Setup has completed. Displaying the power on screen message next.
8B	The first screen message has been displayed. The “[WAIT…]” message is displayed. Performing the PS/2 mouse check and extended BIOS data area allocation check.
8C	Programming the Setup options next.
8D	Going for hard disk controller reset.
8F	Hard disk controller reset done. Floppy Setup is next.

Table 4-12.Uncompressed Initialization Codes (Continued)	
Code	**Description**
91	The floppy drive controller has been configured. Configuring the hard disk drive controller.
95	Initializing the bus option ROMs from C800.
96	Initializing before passing control to the adaptor ROM at C800.
97	Initialization before the C800 adaptor ROM gains control has been completed. The adaptor ROM check is next.
98	The adaptor ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM regained control.
99	Any initialization required after the option ROM test has completed. Configuring the timer data area and printer base address.
9A	Return from setting the timer and printer base address. Setting the RS-232 base address.
9B	Returned from setting the RS-232 base address. Performing any required initialization before the coprocessor test.
9C	Required initialization before the coprocessor test is over. Initializing the coprocessor.
9D	Coprocessor initialized. Performing initialization after coprocessor is tested.
9E	Initialization after the coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key. Issuing the keyboard ID command.
A2	Displaying any soft errors.
A3	Soft error display complete. Going to set keyboard typematic rate.
A4	Keyboard typematic rate set. Programming memory wait states.

Table 4-12.Uncompressed Initialization Codes (Continued)	
Code	**Description**
A5	Memory wait state programming is over. Clearing the screen and enabling parity and the NMI.
A7	NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000.
A8	Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h.
A9	Returned from adaptor ROM at E000h control. Performing any initialization required after the E000 option ROM had control.
AA	Initialization after E000 option ROM control has completed. Displaying the system configuration.
AB	Building the multiprocessor table, if necessary.
AC	Uncompressing the DMI data and initializing DMI POST.
B0	The system configuration is displayed.
B1	Copying code to specific areas.
00	Code copying to specific areas is done. Passing control to INT 19h boot loader.

Flash BIOS Utility

Utilize the AMI Flash BIOS programming utility to update the onboard BIOS for future BIOS versions. Please contact ICS Advent to get this utility if necessary.

Note: Remark or delete any installed Memory Management Utility (such as HIMEM.SYS, EMM386.EXE, QEMM.EXE, etc.) in the CONFIG.SYS files before running the Flash BIOS programming utility.

Chapter 5

Troubleshooting

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Overview

This chapter gives you a few useful tips to quickly get the Endeavor Plus single board computer running without failure. Since basic hardware installation is addressed in Chapter 3, this chapter focuses on system integration issues in terms of backplane setup, BIOS settings, and Operating System diagnostics.

BIOS Settings

It is assumed that the user has correctly adopted the modules and connected all the device cables required before turning on AT power. The CPU, the CPU fan, the CPU fan power cable, the 168-pin SDRAM, the keyboard, the mouse, the floppy drive, the IDE hard disk, the printer, the VGA connector, the device power cables, ATX accessories, and P8/P9 power cables are good examples. With no assurance that these modules and devices are properly accomodated, it is very possible to have system failures that result in the malfunction of any devices applied.

To ensure a successful first-run with the Endeavor Plus, it is recommended that you proceed to the boot-up sequence, by pressing the [DEL] key and entering the BIOS Setup menu to set up a stable BIOS configuration.

Loading the Default Optimal Setting

When prompted with the main setup menu, please scroll down to "**Auto Configuration with Optimal Settings**", press [Enter] and [Y] to load the default optimal BIOS Setup. This will force your BIOS setting back to the initial factory configuration. This is recommended to ensure that the system is running with the BIOS setting that ICS Advent has highly recommended. A user can load the default BIOS setting any time the system appears to be unstable in the boot-up sequence.

Auto Detect Hard Disks

It is common for a user to proceed with "**Auto Detect Hard Disks**" to read the hard drive status information into BIOS memory to reduce the time spent in the boot-up hard disk detection process. However, if this is done and another hard drive is applied without redoing the "**Auto Detect Hard Disks**" procedure, the system will fail to identify the hard disks that are actually connected. A quick way to fix this problem is to enter the BIOS Setup menu for the second time and redo "**Auto Detect Hard Disks**".

There is also another way to prevent this detour. Go to "**Standard CMOS Setup**" and tune in the hard disk status, the "**Primary Master**", and "**Primary Slave**" to "**Auto**" with their "**32 bit mode**" being tuned to "**ON**". This will force your system to automatically detect the current attached hard disks during each boot-up sequence. It is then no longer necessary to manually detect the hard disks each time the boot-up sequence is tried.

Note that loading the default optimal BIOS setting will not change the hard disk detection status back to "**Auto**". You may find that when you load the default BIOS setting, the hard disk detection status remains unchanged.

Additionally, it is also recommended to double check the hard disk or CD-ROM setting in the event of connecting two IDE devices through one IDE port. One of these two devices needs to be configured as a slave device to prevent a detection failure of the IDE devices. There cannot be two IDE devices configured as the master devices at the same time.

Improper Disable Operation

There are many occasions in BIOS Setup where users disable a certain device/feature in one application, but do not enable it before manipulating another application where the disabled device is needed. Users fail to detect this device/feature and end up with a system failure. Please check the BIOS setting so that the devices or ports that you need are not disabled. These include the floppy drive, COM1/COM2 ports, parallel port, USB ports, external cache, and on-chip VGA display mode.

It is also very common that users would like to disable a certain device/port to release IRQ resources. A few good examples are:

- Disable COM1 serial port to release IRQ #4
- Disable COM2 serial port to release IRQ #3
- Disable parallel port to release IRQ #7
- Disable PS/2 mouse to release IRQ #12

A quick review of basic IRQ mapping is given below.

Table 5-1. Basic IRQ Mapping

IRQ #	Description
0	System Counter
1	Keyboard
2	Cascade IRQ
3	COM2
4	COM1
5	Nothing
6	Floppy Disk Controller
7	Printer Port (Parallel Port)
8	CMOS Clock
9	Nothing
10	Nothing
11	Nothing
12	PS/2 mouse
13	Data Processor
14	Primary IDE Controller
15	Secondary IDE Controller

Note: Onboard PCI devices will occupy resources as assigned by BIOS or the operating system. It is very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resources are insufficient, disable some of the devices listed above to release additional resources.

OS Diagnostics

This is a brief guide to properly storing the driver for any Microsoft Windows 95/98/NT device, as well as starting special functions in a specific operating system. For other operating systems, please refer to the the operating system (OS) manual/guidebook.

ACPI Function in Windows 98

Windows 98/2000 are the only operating systems that supports the ACPI function, in terms of activating the suspend-to-RAM feature. This feature is not supported by ICS Advent Legacy backplanesTo enable Windows 98 to search for this feature, a special installation command is required :

(1) setup (standard installation)

(2) setup [space] /p [space] j (support ACPI feature)

Display Setup

By default, any Windows Operating System starts with a resolution of 640 x 480 pixels and a 16-color display. Please load the display driver provided in the Endeavor Plus CD to maximize the VGA performance. If you are using a monitor that Windows cannot identify, you will need to set up a system monitor to correctly retrieve display output, found in the display setup menu. For Windows NT 4.0 users, as the Endeavor Plus provides an AGP type on-chip display feature, Service Pack 3.0 or above is required to activate the AGP VGA display feature.

Network Setup

Windows 95/98 users – Perform the following steps:

1) Install an ISA/PCI network card into an ISA/PCI slot.

2) Start Windows 95/98 and let Window 95/98 automatically detect your network adapter.

3) Provide the driver and complete installation.

4) After you come back to Windows, restart your Windows system.

5) Go to Control Panel > System > Device Manager and verify your network adapter has been installed properly. A warning sign will be displayed if the network adapter has not been installed properly.

6) If the network adapter has not been installed properly, remove this network device from the system Setup menu and restart Windows to detect the network adapter again.

7) When the hardware installation is completed, go to Control Panel > Network to set up the networking configuration. This includes DNS, IP, and Gateway. Appropriate protocols are required to carry out networking activities. Refer to your system administrator for additional assistance.

Windows NT 4.0 users – Perform the following steps:

1) If there is no onboard ethernet capability, or to install a second network interface card (NIC), insert the NIC into the backplane or single board computer.

2) Install the network adapter manually in the Control Panel > Network > Adapter directory. Drivers are required at this stage.

3) Proceed "Binding" after you load the driver.

4) Change to *Protocol Label* and load the desired protocols (generally, TCP/IP). Configuring IP, gateway, and DNS is required for TCP/IP protocol.

5) When the protocol loading is complete, proceed again to "Binding".

6) Restart the system.

7) If there is a situation where the installed network adapter is not working anymore, or the old network driver stays in the system after the network card is changed, remove all the network adapters and protocols from the network setup menu and reload the driver and protocols again. Network setup within Windows NT 4.0 is not as easy as within Windows 95/98. Special familiarity and care are required to have a successful installation.

8) Reapply Service Pack.

Appendix A
WDT Programming

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WDT Programming Guide A-6

General Description

Winbond has a WDT feature inside its W83627HF chip. There are many configuration Registors (CR) in the W83627HF. The following sequence must be followed for CR programming:

1) Enter the extended function mode.

2) Configure the configuration registers.

3) Exit the extended function mode.

For instance:

1) Enter extended function mode.

```
MOV  DX,3F0H
MOV  AL,87H
CLI                 ; disable interrupt
OUT  DX,AL
JMP  $+2
OUT  DX,AL
STI                 ; enable interrupt
```

2) Configurate logical device 1, configuration register CRF0.

```
MOV  DX,3F0H
MOV  AL,07H
OUT  DX,AL          ; point to Logical Device Number Register
MOV  DX,3F1H
MOV  AL,01H
OUT  DX,AL          ; select logical device 1
;
MOV  DX,3F0H
MOV  AL,0F0H
OUT  DX,AL
MOV  DX,3F1H
MOV  AL,3CH
OUT  DX,AL          ; update  CRF0 with value 3Ch
```

3) Exit extended function mode.

```
MOV  DX,3F0H
MOV  AL,0AAH
OUT  DX,AL
```

The Configuration Register (CR) Definition :

- Chip (Global) Control Register (CCR): CR02 -->CR2F.
  CR07 = Logical Device Number Register (LDNR)
- Logical Device 0 (LD0) = FDC , with CR: CR30 -->CRF5 .
- When LDNR (= CR07) = 00h , you can program the CR30 --CRF5 related to FDC feature .
- Logical Device 1 (LD1) = Parallel Port, with CR: CR30 -->CRF0.
- LD2 = UART A (Serial Port 1) , with CR :CR30 -->CRF0.
- LD3 = UART B (Serial Port 2) , with CR :CR30 -->CRF0.
- LD5 = KBC, with CR: CR30 -->CRF0.
- LD6 = IR , with CR: CR30 -->CRF0.
- LD7 = GP I/O Port I, with CR: CR30 -->CRF1.
- LD8 = GP I/O Port II, with CR: CR30 -->CRF4.
- LD9 = GP I/O Port III, with CR: CR30 -->CRF1.
- LDA = ACPI, with CR: CR30 -->CRFF.

Related CR for WDT Programming

CR2C-Bit 3,2 ; [1,0] for WDT function
LD8-CRF2 ; WDT time-out period ,
00h = disabled
01h = 30 seconds
02h = 1.5 minutes
03h = 2.5 minutes
04h = 3.5 minutes
05h = 4.5 minutes
.....
FEh = 253.5 minutes
FFh = 254.5 minutes

When writing a non-zero value to LD8-CRF2 , this value will be loaded into WD counter and start to count down .Read this register can not get the WDT time-out period (the orginal one written into), but the current value in WD counter .

Enable and Refresh WDT : program LD8-CRF2 a non-zero value.

Disable WDT: program LD8-CRF2 with 00h.

LD8-CRF4- Bit 0 : WDT Status
1 = WDT time-out happened
0 = WDT counting

WDT Programming Guide

1) Enter extended function mode as mentioned on the previous page.

2) Program WDT related CR:

a) CR2C-b[3,2]P[1,0] ; Set pin output as WDT function

b) CR07-P08h ; Point to LD8

c) CRF2-Pxyh ; Program WDT time-out period and start count down.

xy = 00 ; No WDT time-out and counting
xy = 01 ; WDT time-out = 30 sec. and starts counting
.....

d) Read CRF4-b0 if needed;

0 : WDT counting
1 : WDT time-out happened

3) Exit extended function mode as mentioned on the previous page.

Example (ENABLE WDT AND SET WDT time-out = 1.5 minutes)

Step 1.

```
MOV  DX,3F0H
MOV  AL,87H
CLI                 ; disable interrupt
OUT  DX,AL
JMP  $+2
OUT  DX,AL
STI                 ; enable interrupt
```

Step 2 .

```
MOV  DX,3F0H
MOV  AL,2CH
OUT  DX,AL
MOV  DX,3F1H
IN   AL,DX            ; READ  CR2C
OR   AL,08H
AND  AL,0FBH
MOV  AH,AL

MOV  DX,3F0H
MOV  AL,2CH
OUT  DX,AL
MOV  DX,3F1H
MOV  AL,AH
OUT  DX,AL            ; CR2C-b[3,2]P[1,0]

MOV  DX,3F0H
MOV  AL,07H
OUT  DX,AL            ; point to Logical Device Number Register
MOV  DX,3F1H
MOV  AL,08H
OUT  DX,AL            ; select logical device 8
;
MOV  DX,3F0H
MOV  AL,0F2H
OUT  DX,AL
MOV  DX,3F1H
MOV  AL,02H
OUT  DX,AL            ; LD8-CRF2-P02h
```

Step 3 . Exit extended function mode

```
MOV  DX,3F0H
MOV  AL,0AAH
OUT  DX,AL
```

REMARK:

**** I/O PORT 3F0h --> Index port for programming CR .
3F1h --> Data port for programming CR .
**** LD8-CRF2-P02h : Program CR index F2h of Logical Device 8
with the value "02h" .

Declaration of Conformity

Information Technology Equipment

6260 Sequence Drive
San Diego, CA 92121-4371
800 523-2320 / 858-677-0877

The product(s) covered by this declaration:

Endeavor Plus™ single board computer:
– model numbers SBC-SCPIII-V, SBC-SCPIII-VE, and SBC-SCPIII-VES

The European Union directives covered by this declaration:

EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC

The basis on which conformity is declared:

EN 50081-1:1992 Emissions, Generic Requirements

-EN 55022 Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

EN 50082-1:1992 Immunity, Generic Requirements

- EN61000-4-2: 1995 Electrostatic Discharge (ESD) Immunity
- EN61000-4-3: 1995 Radiated RF Field Immunity
- EN61000-4-4: 1995 EFT Immunity for AC and I/O Lines

EN 60950:1992 Safety of Information Technology Equipment

The technical documentation required to demonstrate this product meets the requirements of the EMC Directive and the Low Voltage Directive has been compiled by ICS Advent and is available for inspection by the relevant enforcement authorities.

Attention

The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations for use which must be observed when the product is taken into service to maintain compliance with the above directives. Details of these special measures and limitations are in the product manual**.**

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